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10/551,606	01/17/2007	Gotz Burgfels	P-1271	2879

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SCOTT R. COX  
LYNCH, COX, GILMAN & MAHAN, P.S.C.  
500 WEST JEFFERSON STREET  
SUITE 2100  
LOUISVILLE, KY 40202

EXAMINER
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JOHNSON, KEVIN M

ART UNIT	PAPER NUMBER
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1732

NOTIFICATION DATE	DELIVERY MODE
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07/18/2011

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

SCOX@LCGANDM.COM  
HHART@LCGANDM.COM  
KWATKINS@LCGANDM.COM

<b>Office Action Summary</b>	<b>Application No.</b> 10/551,606	<b>Applicant(s)</b> BURGFELS ET AL.	
	<b>Examiner</b> KEVIN JOHNSON	<b>Art Unit</b> 1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 17 May 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 16-28 and 35-63 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 16-28 and 35-63 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                       | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 16-19, 21-28, 35-48, 50, 51 and 53-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katovic et al. (Chemistry Express, 1991, Vol. 6, No.

12, pp. 969-972) in view of Rosinski et al (US 3832449), Kuhl (US 4552739) and Kresge et al. (US 4599475).

In regard to claim 16, Katovic teaches a method of synthesizing ZSM-12 zeolites. The method comprises mixing an aluminum source, a sodium source, precipitated silica as a silicon source, water and TEABr to form a hydrogel system. The hydrogel is crystallized under static conditions at autogeneous pressure in autoclaves (p. 969). The solid produced was ZSM-12 zeolite. In the process disclosed by Katovic the  $\text{TEA}^+/\text{SiO}_2$  ratio ranges from 0.07-0.24 (abstract), with an exemplary embodiment that produces ZSM-12 having a  $\text{TEA}^+/\text{SiO}_2$  ratio of approximately 0.16 (Fig. 1). Katovic only contemplates a single  $\text{H}_2\text{O}:\text{SiO}_2$  molar ratio of 20 (abstract). The required  $\text{H}_2\text{O}:\text{SiO}_2$  molar ratio is not disclosed by Katovic, and Katovic is silent as to the properties of the produced ZSM-12 zeolite. The surface area of the precipitated silica employed in the process is not disclosed by Katovic, but it is disclosed that the particle size and associated surface area of the reagents used is important (p. 971). Stirring the mixture during the crystallization process is not disclosed by Katovic.

Rosinski discloses a method for producing ZSM-12 zeolite. In an exemplary embodiment of the process an  $\text{H}_2\text{O}:\text{SiO}_2$  molar ratio of 13.5 was employed in the reaction mixture (example IV).

Kuhl teaches that when crystallizing ZSM-12 zeolites the reaction mixture may be either static or stirred (column 3, lines 31-32).

Kresge teaches that precipitated silica with surface areas of 140-160  $\text{m}^2/\text{g}$  are particularly preferred for the production of ZSM type zeolites (column 9, lines 18-22).

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Precipitated silica with surface areas of 140-160 m<sup>2</sup>/g are considered to have unusually high surface areas (column 9, lines 18-22).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a H<sub>2</sub>O:SiO<sub>2</sub> molar ratio in the range required by the claims in the reaction mixture disclosed by Katovic. Such a modification would have been motivated by the teaching in Rosinski that ZSM-12 reaction mixtures may utilize H<sub>2</sub>O:SiO<sub>2</sub> molar ratios of 13.5 (example IV). It would have been obvious to one of ordinary skill in the art at the time of the invention to stir the ZSM-12 reaction mixture utilized by Katovic during the crystallization process. Such a modification would have been motivated by the teaching in Kuhl that ZSM-12 reaction mixtures may be stirred during crystallization (column 3, lines 31-32). It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize precipitated silica with a surface area of less than 200 m<sup>2</sup>/g in the process disclosed by Katovic. Such a modification would have been motivated by the teaching in Kresge that precipitated silica with surface areas of 140-160 m<sup>2</sup>/g are particularly preferred for the production of ZSM type zeolites and that precipitated silica with surface areas of 140-160 m<sup>2</sup>/g are considered to have unusually high surface areas. Katovic fails to disclose that the precipitated silica has unusual properties and so one of ordinary skill in the art when considering the disclosure of Kresge would not expect the precipitated silica employed by Katovic to have a surface area in excess of 160 m<sup>2</sup>/g. As the process disclosed by the prior art meets all the limitations of the process in the instant claim, and utilizes the same materials, the zeolite

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produced by the process would necessarily exhibit the properties required by the instant claim.

In regard to claim 17, Katovic discloses a  $M_{2/n}O:SiO_2$  ratio of 0.1 (sample 4).

In regard to claim 18, Katovic discloses a  $SiO_2:Al_2O_3$  ratio of 100 (sample 4).

In regard to claim 19, the crystallization in the process disclosed by Katovic occurs at 150-170°C (p. 969).

In regard to claim 21, Katovic discloses a crystallization time of 6 days, or 144 hours (fig. 10).

In regard to claims 22 and 23, Rosinski teaches that the solid is washed, dried and calcined at 1000°F (example IV). The calcination takes place over a period of 5 hours (example I).

Kuhl teaches that the dried zeolite product is sized prior to calcination at 600°C (example 2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to wash, dry, comminute and then calcine the solid produced by the process as required by the instant claims. Such a modification would have been motivated by the teaching in Rosinski that the solid may be washed, dried and calcined for a period of 5 hours (example I), and the teaching in Kuhl that the solid ZSM-12 product may be sized, or comminuted, prior to calcination at 600°C (example 2).

In regard to claim 24, Rosinski teaches that the material may be ion exchanged with an aqueous solution of ammonium chloride, and then calcined (example IX).

Kuhl teaches that after ion exchanging the material it is washed, dried and then calcined (examples 2 and 3).

It would have been obvious to one of ordinary skill in the art at the time of the invention to ion exchange the material with an ammonium compound, and then wash, dry and calcine the resulting product. Such a modification would have been motivated by the teaching in Rosinski that the material may be ion exchanged with an aqueous solution of ammonium chloride, and then calcined (example IX), and the teaching in Kuhl that after ion exchanging the material it is washed, dried and then calcined (examples 2 and 3).

In regard to claim 25, Rosinski teaches that ZSM-12 zeolites may be molded, by methods including extrusion (column 6, lines 11-14).

In regard to claim 26, Rosinski discloses that a binder may be added to the zeolite material to form a composite. The aluminosilicate preferably accounts for 20-50 wt-% of the resulting composite (column 6, line 63 - column 7, line 2). The binder would then account for 50-80 wt-% of the composite material.

In regard to claims 27 and 28, Rosinski teaches that a form of the ZSM-12 product that incorporates platinum is particularly useful (column 3, line 61 – column 4, line 22).

In regard to claims 35-41, the process of the prior art, Katovic, Rosinski and Kuhl, is the same as the process utilized to produce the zeolite product of the instant claims, and therefore would necessarily produce the same product. For a detailed discussion of the synthesis process see the rejection of claims 16-28.

In regard to claim 42, Rosinski teaches that the ZSM-12 zeolite may be employed as a catalyst for the conversion of organic compounds (column 4, lines 23-25).

In regard to claim 43, Rosinski teaches that ZSM-12 zeolites may be molded, by methods including extrusion (column 6, lines 11-14). It would have been obvious to one of ordinary skill in the art at the time of the invention that the extruded material may be considered to be in lump form.

In regard to claim 44, Rosinski discloses that a binder may be added to the zeolite material to form a composite. The aluminosilicate preferably accounts for 20-50 wt-% of the resulting composite (column 6, line 63 - column 7, line 2). The binder would then account for 50-80 wt-% of the composite material.

In regard to claims 45-48, Rosinski teaches that a form of the ZSM-12 product that incorporates platinum is particularly useful as a catalyst (column 3, line 61 – column 4, line 22).

In regard to claim 50, Rosinski teaches a method for converting an organic feed stream by charging the feed stream over a catalyst containing a ZSM-12 type zeolite (example X).

In regard to claims 51, 54 and 55, Rosinski teaches a process for the hydroisomerization of normal paraffins utilizing the ZSM-12 catalyst. The process takes place at a temperature of 300-550°F, with a liquid hourly space velocity of 0.01-2 in the presence of hydrogen (column 7, lines 30-35). The pressure at which the process is performed is not disclosed, and is therefore considered to be atmospheric pressure.



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The hydroisomerization of higher paraffins is not expressly disclosed. A process for the production of olefins from straight chain hydrocarbon compounds produces a significant amount of  $C_5^+$  gasoline and therefore the organic feed stream must contain higher paraffins (example X and XII).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the hydroisomerization treatment disclosed by Rosinski to treat higher paraffins. Such a modification would have been motivated by the teaching in Rosinski that the process is useful for the treatment of normal paraffins, and that the zeolite catalyst is useful for the treatment of straight chain compounds with a chain length greater than  $C_5$  (examples X and XII).

In regard to claim 53, Rosinski teaches that the catalyst may be used for aromatic hydroisomerization (column 7, lines 36-38).

In regard to claims 56-62, Rosinski teaches that the catalyst may be used in processes for reforming hydrocarbons, reduction of pour points of paraffinic charge stocks, polymerization of olefins or acetylinic hydrocarbons, alkylation of hydrocarbons, dehydration/hydration of organics and dehydrogenation of organics (column 3, lines 5-23). A catalyst comprising a ZSM-12 material may also be employed in a process for the desulfurization of organics (column 7, lines 44-47).

In regard to claim 63, Kuhl discloses that ZSM-12 based catalysts may be utilized in processes for the conversion of alcohols to hydrocarbons (column 5, lines 36-42).

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5. Claims 20 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katovic, Rosinski, Kuhl and Kresge as applied to claims 16 and 45 above, and further in view of Sumitani et al. (US 4557919).

In regard to claim 20, Katovic, Rosinski, Kuhl and Kresge fail to teach the extent of the washing process.

Sumitani discloses a process for producing ZSM-12 zeolites in which the produced zeolites are washed with pure water until the ion conductivity of the wash water is less than 50  $\mu\text{S}/\text{cm}$  (column 8, lines 40-43).

It would have been obvious to one of ordinary skill in the art at the time of the invention to wash the material produced by Katovic, Rosinski, Kuhl and Kresge with water until the conductivity of the wash water was in the range required by the instant claim. Such a modification would have been motivated by the teaching in Katovic, Rosinski and Kuhl that the zeolite product is washed and the disclosure in Sumitani that ZSM-12 zeolites are preferably washed with pure water until the ion conductivity of the wash water is less than 50  $\mu\text{S}/\text{cm}$  (column 8, lines 40-43).

In regard to claim 49, Katovic, Rosinski and Kuhl fail to disclose the amount of catalytically active component contained in the catalyst.

Sumitani discloses a platinum containing catalyst, where the platinum accounts for 0.01-5 wt-% of the catalyst composition (column 11, lines 22-25).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a catalytically active component in the amount required by the instant claim. Such a modification would have been motivated by the teaching in

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Sumitani that ZSM-12 containing catalysts beneficially contain a catalytically active component, such as platinum, in an amount of 0.01-5 wt-% of the catalyst composition (column 11, lines 22-25).

6. Claim 52 is rejected under 35 U.S.C. 103(a) as being unpatentable over Katovic, Rosinski, Kuhl and Kresge as applied to claim 51 above, and further in view of Monque et al. (US 5576256).

In regard to claim 52, Katovic, Rosinski, Kuhl and Kresge fail to disclose the use of n-octane in a hydroisomerization process.

Monque discloses a hydroisomerization process that utilizes a ZSM-12 containing catalyst (column 3, lines 36-40) and for the treatment of an n-octane feed stream (column 7, lines 56-59).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize an n-octane feed stream in the hydroisomerization process disclosed by Katovic, Rosinski and Kuhl. Such a modification would have been motivated by the teaching in Monque that ZSM-12 containing catalysts, the type utilized by Katovic, Rosinski and Kuhl, are especially suited for the treatment of n-octane.

### ***Response to Arguments***

1. Applicant's arguments filed 5/17/2011 have been fully considered but they are not persuasive.

The argument that one of ordinary skill in the art would not have been motivated to utilize a  $\text{TEA}^+/\text{SiO}_2$  ratio of less than 0.2 by the disclosure of Katovic is not persuasive. Katovic teaches that the  $\text{TEA}^+/\text{SiO}_2$  ratio ranges from 0.07-0.24 are useful

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for the production of ZSM-12 (abstract), and an exemplary embodiment that produces ZSM-12 as the primary product employing a  $\text{TEA}^+/\text{SiO}_2$  ratio of approximately 0.16 (Fig. 1). As a result, one of ordinary skill in the art at the time of the invention would be motivated to utilize a  $\text{TEA}^+/\text{SiO}_2$  ratio in the range required by the instant claims because Katovic expressly teaches a process for the production of ZSM-12 that utilizes a  $\text{TEA}^+/\text{SiO}_2$  ratio falling within the required range.

The argument that the use of precipitated silica compared to colloidal silica results in an unexpectedly increased production of ZSM-12, and that as a result Rosinski is not applicable to the instant claims is not persuasive. Katovic discloses that the use of precipitated silica yields an increased amount of ZSM-12 when compared to colloidal silica (compare examples 3 and 4). There is no explicit teaching in Rosinski that precipitated silica may not be employed, and based on the disclosure in Katovic one of ordinary skill in the art would expect the ZSM-12 yield to increase when precipitated silica is utilized.

### ***Conclusion***

2. Applicant's amendment to the independent claims necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEVIN JOHNSON whose telephone number is (571)270-3584. The examiner can normally be reached on Monday-Friday 9:00 AM to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Mayes can be reached on 571-272-1234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/KEVIN JOHNSON/

/DAVID M BRUNSMAN/

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Examiner, Art Unit 1732

Primary Examiner, Art Unit 1732